

ENGINEERING INDEX PROPERTIES
Moody County, South Dakota

Engineering Index Properties table gives the engineering classifications and the range of index properties of each soil in the survey area. Depth to the upper and lower boundaries of each layer is indicated in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. Loam, fine soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content is coarser than sand is 15 percent or more, an appropriate modifier is added, for example, gravelly. Texture defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 1994) system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 1998). System classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of eight groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection. If laboratory tests are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. Classification for soils tested, with group index numbers in parentheses, is given in Engineering Index table.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume proportions in the field to weight percentage. Percentage (of soil particles) passing designated sieves is the percentage of the fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 Series, have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. Estimates are based on test data from the survey area or from nearby areas and on field examination. The estimates of size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. The ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across class boundaries, the classification in the marginal zone is generally omitted in the table.

ENGINEERING INDEX PROPERTIES--Continued
Moody County, South Dakota

(Absence of an entry indicates that the data were not estimated.)

ENGINEERING INDEX PROPERTIES--Continued
Moody County, South Dakota

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Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passi sieve number--		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
					Pct	Pct			
DgD: Delmont-----	In								
Talmo-----	0-8	Loam	CL	A-6, A-4	0	0	90-100	90-100	80-95
	8-16	Loam	SC-SM, CL, SC, CL-ML	A-6, A-4	0	0	80-100	70-100	50-100
	16-60	Very gravelly loamy sand	SM, SW, SW- SM, SC-SM	A-2, A-1	0	0-5	60-100	40-80	15-50
DmA: Dempster-----	0-8	Gravelly loam	SC, CL	A-6, A-4	0	0-5	90-100	65-90	35-90
	8-60	Very gravelly sand	GW, SM, GM, SW	A-2, A-1	0	0-10	40-95	20-65	15-35
	31-36								
DmB: Dempster-----	0-8	Silt loam	CL-ML, CL	A-6, A-4	0	0	100	100	90-100
	8-31	Silty clay loam	ML, CL	A-6, A-4, A-7	0	0	100	100	90-100
	31-36	Silt loam	CL, ML	A-4, A-7, A-6	0	0	100	100	85-95
DnB: Dempster-----	36-60	Very gravelly sand	SW-SM, SM, SW, GP-GM	A-2, A-1, A-3	---	0-5	55-90	30-75	20-60
	0-8								
	8-31								
Talmo-----	31-36								
	0-8	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	90-100
	8-60	Silty clay loam	ML, CL	A-6, A-4, A-7	0	0	100	100	90-100
Do: Dimo-----	31-36	Silt loam	CL, ML	A-4, A-7, A-6	0	0	100	100	85-95
	36-60	Very gravelly sand	SM, SW, GP- GM, SW-SM	A-2, A-1, A-3	---	0-5	55-90	30-75	20-60
	0-8								
DsB: Doland-----	8-60	Gravelly loam	CL, SC	A-4, A-6	0	0-5	90-100	65-90	35-90
	0-8	Very gravelly sand	GM, SW, SM, GW	A-1, A-2	0	0-10	40-95	20-65	15-35
	31-60								
DvA: Doland-----	0-8	Clay loam	CL	A-6, A-7	0	0	100	100	85-95
	8-31	Loam	CL	A-6, A-7	0	0	90-100	85-100	85-95
	31-60	Very gravelly sand	SW-SM, SM, SC-SM, SP-SM	A-1, A-3, A-2	0	0-5	60-90	40-70	20-60
Bonilla-----	0-8	Loam	ML, CL, CL-ML	A-6, A-4	0	0	100	100	85-95
	8-23	Silt loam	ML, CL	A-6, A-4	0	0	100	100	85-100
	23-28	Silt loam	CL, ML	A-6, A-4	0	0	100	100	85-100
Eeb: Egan-----	28-60	Clay loam	CL	A-7, A-6	0	0	90-100	85-95	80-90
	0-8								
	8-23								
Eeb: Egan-----	23-28	Silt loam	CL-ML, CL	A-6, A-4	0	0	100	95-100	75-100
	28-60	Clay loam	CL	A-7, A-6	0	0	90-100	85-95	80-90
	0-14	Loam	CL-ML, CL	A-6, A-4	0	0	100	95-100	75-100
EnA: Enet-----	14-38	Clay loam	CL	A-7, A-6	0	0	100	95-100	85-100
	38-53	Silt loam	CL	A-7, A-6	---	0-5	95-100	95-100	85-100
	53-60	Silt loam	CL	A-7, A-6	---	0-5	95-100	95-100	85-100
EoA: Enet-----	0-8	Silty clay loam	CL, ML	A-7, A-6	0	0	100	100	95-100
	8-24	Silty clay loam	CH, CL, MH, ML	A-7, A-6	0	0	100	95-100	90-100
	24-33	Silty clay loam	CH, CL, ML, MH	A-7, A-6	0	0	100	95-100	90-100
Ethan-----	33-44	Clay loam	MH, ML, CH, CL	A-7, A-6	0	0-5	95-100	80-100	70-100
	44-60	Clay loam	ML, CH, CL, MH	A-7, A-6	0	0-5	95-100	80-100	70-100
	0-8	Loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	90-100	85-100
EnA: Enet-----	8-33	Clay loam	CL	A-6, A-7	0-3	0-5	95-100	90-100	80-100
	33-60	Clay loam	CL	A-6, A-4, A-7	0-3	0-5	90-100	85-100	75-100
	0-8								
EoA: Enet-----	8-22	Loam	CL, ML	A-4, A-6	0	0	100	100	85-95
	22-26	Sandy loam	SC, SM, CL, ML	A-4, A-6	0	0	90-100	85-95	60-95
	26-60	Very gravelly sand	SW-SM, SC-SM, SW, SM	A-1, A-3, A-2	0	0	60-95	45-90	10-60
EoA: Enet-----	0-8	Loam	CL, ML	A-6, A-4	0	0	100	100	85-95

ENGINEERING INDEX PROPERTIES--Continued
Moody County, South Dakota

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Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passi sieve number--		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
					Pct	Pct			
	In								
ErD:	0-8	Loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	90-100	85-100
	8-33	Clay loam	CL	A-7, A-6	0-3	0-5	95-100	90-100	80-100
	33-60	Clay loam	CL	A-6, A-4, A-7	0-3	0-5	90-100	85-100	75-100
	0-8	Loam	CL-ML, CL	A-4, A-6	0	0-5	95-100	95-100	85-100
Clarno-----	8-15	Loam	CL	A-6, A-7	0	0-5	95-100	90-100	80-100
	15-47	Clay loam	CL	A-6, A-7	0-1	0-5	95-100	90-100	80-100
	47-60	Clay loam	CL	A-6, A-7	0-3	0-5	95-100	90-100	80-100
EsD:	0-8	Loam	CL-ML, CL	A-4, A-6	5-20	20-50	95-100	90-100	80-95
	8-33	Clay loam	CL	A-4, A-7, A-6	0-5	0-5	95-100	95-100	85-100
	33-60	Clay loam	CL	A-4, A-7, A-6	0-3	0-5	90-100	85-100	75-100
	0-8	Loam	CL, CL-ML	A-4, A-6	5-20	20-50	95-100	90-100	80-95
Clarno-----	8-15	Loam	CL	A-6, A-7	0	0-5	95-100	90-100	80-100
	15-47	Clay loam	CL	A-6, A-7	0-1	0-5	95-100	90-100	80-100
	47-60	Clay loam	CL	A-6, A-7	0-3	0-5	95-100	90-100	80-100
Etc:	0-8	Loam	CL, CL-ML	A-4, A-6	0	0-5	95-100	90-100	85-100
	8-33	Clay loam	CL	A-6, A-7	0-3	0-5	95-100	90-100	80-100
	33-60	Clay loam	CL	A-4, A-7, A-6	0-3	0-5	90-100	85-100	75-100
	0-8	Silty clay loam	CL, ML	A-7, A-6	0	0	100	100	95-100
Egan-----	8-24	Silty clay loam	CL, MH, CH, ML	A-7, A-6	0	0	100	95-100	90-100
	24-33	Silty clay loam	ML, CH, CL, MH	A-7, A-6	0	0	100	95-100	90-100
	33-44	Clay loam	CH, MH, CL, ML	A-7, A-6	0	0-5	95-100	80-100	70-100
	44-60	Clay loam	ML, CL, CH, MH	A-7, A-6	0	0-5	95-100	80-100	70-100
ExC:	0-8	Loam	CL, CL-ML	A-6, A-4	5-20	20-50	95-100	90-100	80-95
	8-33	Clay loam	CL	A-6, A-4, A-7	0-5	0-5	95-100	95-100	85-100
	33-60	Clay loam	CL	A-4, A-7, A-6	0-3	0-5	90-100	85-100	75-100
	0-8	Silty clay loam	CL, ML	A-7, A-6	0	0	100	100	95-100
Egan-----	8-24	Silty clay loam	CL, MH, ML, CH	A-7, A-6	0	0	100	95-100	90-100
	24-33	Silty clay loam	CH, MH, CL, ML	A-7, A-6	0	0	100	95-100	90-100
	33-44	Clay loam	CH, MH, ML, CL	A-7, A-6	0	0-5	95-100	80-100	70-100
	44-60	Clay loam	CL, MH, CH, ML	A-6, A-7	0	0-5	95-100	80-100	70-100
FaA:	0-8	Loam	CL, CL-ML	A-6, A-4	0	0	100	100	85-100
	8-32	Silt loam	ML, CL	A-6, A-4, A-7	0	0	100	95-100	85-100
	32-38	Sandy loam	SC, SM, SC-SM	A-4	0	0	100	95-100	60-70
	38-60	Loamy sand	SM, SC-SM, SW-SM	A-2	0	0	100	100	50-75
FaB:	0-8	Loam	CL, CL-ML	A-4, A-6	0	0	100	100	85-100
	8-32	Silt loam	ML, CL	A-4, A-7, A-6	0	0	100	95-100	85-100
	32-38	Sandy loam	SM, SC-SM, SC	A-4	0	0	100	95-100	60-70
	38-60	Loamy sand	SW-SM, SM, SC-SM	A-2	0	0	100	100	50-75
FmB:	0-8	Loam	CL, CL-ML	A-6, A-4	0	0	100	100	85-100
	8-32	Silt loam	CL, ML	A-6, A-4, A-7	0	0	100	95-100	85-100
	32-38	Sandy loam	SM, SC-SM, SC	A-4	0	0	100	95-100	60-70
	38-60	Loamy sand	SW-SM, SM, SC-SM	A-2	0	0	100	100	50-75
Maddock-----	0-8	Sandy loam	SM	A-2, A-4	0	0	100	100	60-85
	8-60	Fine sand	SP-SM, SM	A-2, A-3	0	0	95-100	95-100	60-100
Ga:	0-8	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100
	8-48	Silty clay loam	CL	A-6, A-4, A-7	0	0	100	100	90-100
	48-60	Very gravelly sand	GM, SW-SM, SM, GW-GM	A-2, A-1	0	0	40-80	30-70	20-50
GrB:	0-8	Loam	CL, ML	A-6, A-4	0	0	100	95-100	90-100
	8-14	Loam	ML, CL	A-6, A-4, A-7	0	0	100	95-100	90-100
	14-35	Loam	SC-SM, CL-ML, ML	A-4, A-6	0	0	100	95-100	85-100

Section II
Soil and Site Information

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ENGINEERING INDEX PROPERTIES--Continued
Moody County, South Dakota

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth In	USDA texture	Classification		Fragments		Percentage passi sieve number--		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
					Pct	Pct			
GvA: Grovena-----	0-8	Loam	CL, ML	A-4, A-6	0	0	100	95-100	90-100
	8-14	Loam	ML, CL	A-4, A-7, A-6	0	0	100	95-100	90-100
	14-35	Loam	SC-SM, ML, CL-ML	A-6, A-4	0	0	100	95-100	85-100
	35-42	Silt loam	SM, CL, ML, SC	A-6, A-4	0	0	95-100	95-100	90-100
	42-60	Stratified sandy loam to silt loam	CL, CL-ML	A-6, A-4	0	0	95-100	95-100	85-100
	60-78	Clay loam	CL, CL-ML	A-6, A-4	0	0	100	95-100	75-100
Bonilla-----	0-14	Loam	CL, CL-ML	A-6, A-4	0	0	100	95-100	75-100
	14-38	Clay loam	CL	A-7, A-6	0	0	100	95-100	85-100
	38-53	Silt loam	CL	A-7, A-6	---	0-5	95-100	95-100	85-100
	53-60	Silt loam	CL	A-7, A-6	---	0-5	95-100	95-100	85-100
HoA: Houdek-----	0-8	Clay loam	CL	A-7, A-6	0	0-5	95-100	95-100	85-100
	8-17	Clay loam	ML, CL	A-7, A-6	0	0-5	95-100	95-100	85-100
	17-43	Clay loam	ML, CL	A-7, A-6	0-1	0-10	95-100	95-100	85-100
	43-60	Clay loam	CL	A-7, A-6	0	0-5	90-100	90-100	80-100
HoB: Houdek-----	0-8	Clay loam	CL	A-7, A-6	0	0-5	95-100	95-100	85-100
	8-17	Clay loam	CL, ML	A-7, A-6	0	0-5	95-100	95-100	85-100
	17-43	Clay loam	CL, ML	A-7, A-6	0-1	0-10	95-100	95-100	85-100
	43-60	Clay loam	CL	A-7, A-6	0	0-5	90-100	90-100	80-100
HsC: Houdek-----	0-8	Clay loam	CL	A-7, A-6	0	0-5	95-100	95-100	85-100
	8-17	Clay loam	ML, CL	A-7, A-6	0	0-5	95-100	95-100	85-100
	17-43	Clay loam	ML, CL	A-7, A-6	0-1	0-10	95-100	95-100	85-100
	43-60	Clay loam	CL	A-7, A-6	0	0-5	90-100	90-100	80-100
Shindler-----	0-7	Clay loam	CL, ML	A-7, A-6	0	0-5	95-100	95-100	85-100
	7-12	Clay loam	CL	A-7, A-6	0-5	0-5	95-100	95-100	85-100
	12-60	Clay loam	CL	A-7, A-6	0-5	0-5	95-100	95-100	85-100
	60-78	Clay loam	CL	A-7, A-6	0-5	0-5	95-100	95-100	85-100
HsD: Houdek-----	0-8	Clay loam	CL	A-7, A-6	0	0-5	95-100	95-100	85-100
	8-17	Clay loam	CL, ML	A-7, A-6	0	0-5	95-100	95-100	85-100
	17-43	Clay loam	ML, CL	A-7, A-6	0-1	0-10	95-100	95-100	85-100
	43-60	Clay loam	CL	A-7, A-6	0	0-5	90-100	90-100	80-100
Shindler-----	0-7	Clay loam	ML, CL	A-7, A-6	0	0-5	95-100	95-100	85-100
	7-12	Clay loam	CL	A-7, A-6	0-5	0-5	95-100	95-100	85-100
	12-60	Clay loam	CL	A-7, A-6	0-5	0-5	95-100	95-100	85-100
	60-78	Clay loam	CL	A-7, A-6	0-5	0-5	95-100	95-100	85-100
HtD: Houdek-----	0-8	Clay loam	CL	A-7, A-6	0	0-5	95-100	95-100	85-100
	8-17	Clay loam	CL, ML	A-7, A-6	0	0-5	95-100	95-100	85-100
	17-43	Clay loam	CL, ML	A-7, A-6	0-1	0-10	95-100	95-100	85-100
	43-60	Clay loam	CL	A-7, A-6	0	0-5	90-100	90-100	80-100
Talmo-----	0-7	Clay loam	ML, CL	A-7, A-6	0	0-5	95-100	95-100	85-100
	7-12	Clay loam	CL	A-7, A-6	0-5	0-5	95-100	95-100	85-100
	12-60	Clay loam	CL	A-7, A-6	0-5	0-5	95-100	95-100	85-100
	60-78	Clay loam	CL	A-7, A-6	0-5	0-5	95-100	95-100	85-100
HuA: Huntimer-----	0-8	Silty clay loam	ML, CL, MH, CH	A-7	0	0	100	100	95-100
	8-24	Silty clay	CL, CH, ML, MH	A-7	0	0	100	100	95-100
	24-29	Silty clay loam	CH, ML, MH, CL	A-7	0	0	100	100	95-100
	29-60	Stratified very fine sandy loam to silty clay loam	CL, CH	A-6, A-7	0	0	100	95-100	95-100
KaB: Kranzburg-----	0-8	Silty clay loam	CL, CH	A-7	0	0	100	100	95-100
	8-27	Silty clay loam	CL, CH	A-7	0	0	100	100	95-100
	27-35	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100
	35-39	Clay loam	CL	A-7, A-6	0	0	95-100	90-100	80-100
	39-60	Clay loam	CL	A-7, A-6	0	0	95-100	90-100	80-100
Kba: Kranzburg-----	0-8	Silty clay loam	CL, CH	A-7	0	0	100	100	95-100
	8-27	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100
	27-35	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100
	35-39	Clay loam	CL	A-6, A-7	0	0	95-100	90-100	80-100
	39-60	Clay loam	CL	A-6, A-7	0	0	95-100	90-100	80-100
Brookings-----	0-13	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100

ENGINEERING INDEX PROPERTIES--Continued
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Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passi sieve number--		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
					Pct	Pct			
WCA: Wentworth-----	In								
Wentworth-----	0-8	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100
	8-27	Silty clay loam	ML, CL, MH, CH	A-6, A-7	0	0	100	100	95-100
	27-60	Stratified silt loam to silty clay loam	CL, ML	A-4, A-7, A-6	0	0	100	95-100	85-100
Chancellor-----	0-12	Silty clay loam	CH, ML, MH, CL	A-7, A-6	0	0	100	100	95-100
	12-38	Silty clay	CH, CL	A-7	0	0	100	100	95-100
	38-60	Silty clay loam	ML, CL, CH, MH	A-6, A-7	0	0	100	100	85-100
Wakonda-----	0-8	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100
	8-35	Silty clay loam	CL	A-6, A-7	0	0	95-100	95-100	90-100
	35-60	Silty clay loam	CL	A-7, A-6	0	0	95-100	95-100	85-95
WeB: Wentworth-----	0-8	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100
	8-27	Silty clay loam	CL, ML, CH, MH	A-6, A-7	0	0	100	100	95-100
	27-60	Silt loam	ML, CL	A-4, A-7, A-6	0	0	100	95-100	85-100
Egan-----	0-8	Silty clay loam	CL, ML	A-7, A-6	0	0	100	100	95-100
	8-24	Silty clay loam	CH, CL, MH, ML	A-7, A-6	0	0	100	95-100	90-100
	24-33	Silty clay loam	CH, CL, ML, MH	A-7, A-6	0	0	100	95-100	90-100
WhA: Wentworth-----	33-44	Clay loam	MH, ML, CH, CL	A-7, A-6	0	0-5	95-100	80-100	70-100
	44-60	Clay loam	ML, CH, CL, MH	A-7, A-6	0	0-5	95-100	80-100	70-100
	0-8	Silty clay loam	CL	A-7, A-6	0	0	100	100	95-100
Trent-----	8-27	Silty clay loam	CL, CH, ML, MH	A-7, A-6	0	0	100	100	95-100
	27-60	Silt loam	ML, CL	A-6, A-4, A-7	0	0	100	95-100	85-100
	0-13	Silty clay loam	CH, CL, MH, ML	A-6, A-7	0	0	100	100	95-100
Wo: Worthing-----	13-31	Silty clay loam	CL, CH	A-6, A-7	0	0	100	95-100	90-100
	31-35	Silty clay loam	CL	A-4, A-7, A-6	0	0	100	95-100	90-100
	35-60	Silt loam	ML, CL	A-6, A-4, A-7	0	0	100	90-100	85-100
Worthing-----	0-10	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100
	10-45	Silty clay	MH, CH	A-7	0	0	100	100	95-100
	45-60	Silty clay	CL, MH, ML, CH	A-7	0	0	100	95-100	90-100

